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Food Safety Program Performance in Ontario

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Executive Summary

Food safety is a critical component of any modern public health system. Food premise inspections and investigations reduce the risk of food borne illness in the community. Boards of Health (BOH) in Ontario are required to provide a comprehensive food safety program along with a number of other public health programs and services. The establishment of Public Health Accountability Agreements in Ontario, which link program funding to program performance, increases the demands on health units to deliver effective and efficient public health programs including food safety. Identifying what factors can potentially improve BOH food safety program performance is critical.

The objective of this study was to identify the characteristics associated with food safety program performance delivered in Ontario by local BOH. All 36 health units in Ontario were survey which resulted in a response rate of 94% (34). The 2012 food premises compliance inspection data was used to establish a program score for each BOH. Local health department characteristic data was also collected through various sources, including a survey. Information collected included: health unit administration, program delivery (specialized versus generalized), resources, population size, and geography.

Analysis of the data indicates that food safety program performance is significantly associated with health departments that are characterized as being more urbanized with higher population communities. Jurisdictions with more urbanized areas were shown to have better performance than those health departments with more rural settings.

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Table of Contents

Introduction

You are what you eat is a truism that many of us are told by our mothers. Food is an important element of human growth and development. Subsequently, access to safe food is a basic requirement of food quality.

Food has been historically been a cause of significant disease and mortality (WHO, 2000). Food borne illness has been shown to cause major illness in Canada and has resulted in a national estimated cost of $3.7 billion annually, largely as a result of work absences by individuals with acute gastrointestinal illness (PHAC, 2008). Advances in the last century in the area of food safety, including regulation, have allowed for a much safer food supply (Ward, 2007). Food safety continues to be of significant importance in light of a number of high profile food safety issues and outbreaks including the 2008 Listeria outbreak of cold cut meats that resulted in 57 confirmed cases and 22 deaths (MOHLTC, 2009). A more recent example was the 2012 E.coli outbreak associated with a raw beef from a producer in Alberta. To date this is the largest beef recall in Canadian history that affected consumers in Canada and the United States. There were 18 confirmed cases of E.coli associated with the outbreak (CBC, 2012).

Prevention of food borne disease requires actions from both the public and private sectors, with governments taking on the role through legislative regulatory actions including proactive inspections (WHO, 2000). Government food safety programs historically have improved public health by reducing disease and mortality related to food borne pathogens (Wagstaff, 1986). Food safety in Canada is a complex set of shared responsibilities between the federal, provincial and local municipal level governments.

Increasingly governments are under pressure to ensure value for money in the delivery of services (Drummond, 2012). Public health programs such as food safety are under similar scrutiny. The province of Ontario has recently introduced Public Health Accountability Agreements for local boards of health linking public health program performance to provincial funding. In light of the increased focus of local public health unit funding and accountability for the delivery of programs and services, the purpose of this research is to identify and explain the factors that cause variation among food safety program performance at the local level. The food safety programs of the 36 Ontario public health departments will be examined in a cross sectional study which will examine the performance and characteristics that existed in 2012.

Federal Food Safety

Federal organizations responsible for food safety include the Canadian Food Inspection Agency (CFIA), Health Canada (HC), and the Public Health Agency of Canada (PHAC). They are responsible for inspection and compliance activities for large cross provincial or international food production companies. They also play the main role in animal health and inspections of meat processing facilities (Haines, 2004). The federal government also has the powers of criminal law to deal with cases of adulteration or sabotage of food within Canada (Haines, 2004).

Ontario Food Safety

Ontario provincial organizations responsible for food safety include the Ministry of Health and Long-Term Care (MOHLTC), the Ontario Ministry of Agriculture and Food (OMAF), Ministry of Rural Affairs (MRA), the Ministry of Natural Resources (MNR), the Ministry of Environment (MOE), and Public Health Ontario (PHO). The Ontario government's primary function is related to legislation, funding, and, in the case of Public Health

Ontario, to provide scientific and technical advice on matters related to food safety and outbreak investigation. The provincial government has some limited responsibility related to direct food safety inspections. Examinations by provincial inspectors are typically limited to meat, fish, dairy and produce in production facilities and farms where no product leaves the province (Haines, 2004). The primary piece of public health legislation in Ontario is the *Health Protection and Promotion Act* (HPPA), the legislation provides for the organization and delivery of public health programs in Ontario. The legislation establishes local boards of health (BOH) and identifies the duties and responsibilities of the 36 boards of health in Ontario. The act also sets out the powers and responsibilities of a number of different professionals involved in public health including medical officers or health, public health nurses and public health inspectors (HPPA, 1990). The document also allows for the creation of regulations and sets out the penalties for failing to comply with the act. In addition, the HPPA provides for the creation of public health program standards under the direction of the Minister of Health such as the Ontario Public Health Standards (OPHS) (HPPA, 1990). These standards lay out the minimum requirements for all public health programs which are administered at the local level (OPHS, 2008). Activities prescribed in the OPHS include assessment, surveillance, health protection and health promotion. The program standards cover a wide area of public health issues including chronic disease, family health, infectious disease and environmental health which includes the food safety program. The standards are further broken down into protocols which identify the operational roles and responsibilities of each BOH (OPHS, 2008). Required activities specific to food safety includes frequency of food premises inspections, response times to food borne illness complaints, and food safety education training (OPHS, 2008).

The province is also the major funding body for public health programs. Funding boards of health are established through the HPPA. The province provides resources to local level health departments for the delivery of public health programs including food safety. The province is supposed provide 75% funding for public health programs with the local municipalities providing the remaining 25%. In many instances the province makes discretionary annual grants to local health units. Often these grants make up 100% of a program's funding requirements. However, health units are required to submit their annual budgets to the province for approval. Often health departments contribute more than 25% share of program funding in order to address local needs (MOHLTC/PHB, 2009).

Historically there have been many different variations of the cost sharing agreements between the province and local health units. In 1995 the agreement was similar to the current arrangement with a 75/25 provincial – municipal split. In 1998 the funding for public health became 100% municipal. This changed again in 1999 with the province providing 50% funding. From 2004 to 2007, the formula transitioned annually from 50/50 to the current 75/25 agreement. Continued changes in funding have caused some concerns from health units and the municipalities they represent, about stable predictable funding from the province (Capacity Review, 2006). Other issues related to program funding relate to health units that serve fast-growing populations centres or jurisdictions with high levels of poverty. There is no standard formula for addressing these local conditions which may require additional funds to address these situations (Capacity Review, 2006).

Closely linked with funding is the issue of accountability. In 2011, the province introduced the Public Health Accountability Agreements which is intended to incorporate

financial and performance management indicators and continuous quality improvement tools. Indicators are program-based and focus on performance of BOH outcomes. These agreements are binding contracts with health departments linking program performance to provincial funding. They cover a number of public health program areas including safe water, vaccine preventable disease, communicable disease and tobacco control. They also include a measure of food safety compliance of food premises (MOHLTC, 2011). The 2011 Public Health Accountability Agreement for food safety is the percentage of high risk food premises (e.g. hospitals, daycares, full service restaurants) that have been inspected in accordance with the MOHLTC standard. High risk premises are to be inspected no less than once every 4 months within the calendar year (OPHS, 2008).

Public Health Accountability Agreements are significant to public health departments because, as mentioned previously, they are tied to funding. They also require the BOH to sign a three year agreement binding the BOH to meet the requirements set out in the accountability agreement. The agreements are intended to meet the MOHLTC target for performance measurement of the public health system (MOHLTC, 2011). The goal of the accountability agreement is to demonstrate value for money. The performance indicators are based on the past performance of the health department within the specific program areas. The measures are intended to be activities or programs the health unit has direct control over, such as inspection frequencies or response times; however, some of the health promotion targets include measures of societal outcomes which health departments can influence but ultimately, responsibility rests with the community at large (e.g., percentage of adults who smoke residing in the community). The performance measures are based on provincial targets and will include incremental multi-year increases in performance (if required), based on a health departments past performance (MOHLTC, 2011).

Local Municipal Food Safety

Primary accountability for food safety inspections in Ontario rests with 36 local BOH with an overall responsibility of over 80,000 food premises in Ontario (City of Toronto, 2009). BOH are legislated to provide public health services including a comprehensive food safety program, along with a number of other wide ranging public health programs. The OPHS includes the Food Safety Protocol which identifies the minimum expectations for food safety programs administered by local boards of health. The purpose of the food safety standard is to prevent or reduce the burden of food borne illness (OPHS, 2008). The OPHS require BOH to provide a number of food safety related activities including, but not limited to: response to outbreaks, complaint investigations, food safety education and compliance inspections of food premises (OPHS, 2008).

Boards of Health are required to report annually on their food safety activities to both the MOHLTC and the local community. One of the primary activities of the program is compliance inspections of food premises. These inspections are meant to ensure food premises are operating within the minimum standard of the law. This compliance inspection data will provide the foundation for this paper.

Under the current MOHLTC protocol, health departments are required to maintain a database of the food premises within their jurisdiction. These premises are risk assessed into three categories; high, moderate and low. A food premise's risk category will determine the number of required annual inspections. High risk food premises (e.g. hospitals, daycares, full serve restaurants), are to be inspected not less than once every four months, moderate risk e.g. fast food, take-outs are to be inspected not less than every six months and low risks e.g. convenience stores are to be inspected not less than every twelve months (OPHS, 2008).

Literature Review

There are no relevant studies specific to the performance of health department food safety programs. However, there are a number of articles that address the overall performance of health departments. There are two main areas of focus, the first concerns what should be measured as a part of a program performance assessment in the public health field. The second outlines the common characteristics of health departments that have been identified as higher performing. The following is a brief summary of the articles reviewed.

Rohrer et al (1997), conducted a study assessing local public health performance in Iowa. The study used indicators grouped into three categories: assessment, policy development and assurance. The assessment category included indicators such as investigating adverse health effects and conducting community health needs assessments. The policy development category included indicators such as educating elected officials about public health priorities and established formal linkages between different public health organizations and levels of government. The last category, assurance, used indicators such as keeping the public and media informed about public health issues and problems (Rohrer, 1997).

A study conducted by Handler et al (2001), examined the framework of performance measurement in the American public health system. They identified a number of areas for potential assessment of health department performance. They included first, structural capacity, which primarily focuses on the financial, staff, and technological resources required to deliver public health programs. Second, public health processes

which includes the methods and functions to deliver programs including surveillance, education and law enforcement. Finally, they identified the importance of measuring outcomes on the community, specifically were there measurable positive outcomes of the public health interventions (Handler, 2001)

Derose et al (2002), discuss what aspects of local health departments should be included for assessment. Derose breaks down quality assessment of health department services into three main categories. The first, structural quality, describes the organizational structural characteristics and the resources available to health units. Items in this category would include human resources, financial resources and equipment (e.g. computers). The second category, process quality, assesses services health units deliver to the community. Examples of processes included in this area of assessment are; number of infectious diseases followed up within a specific time frame or number of mandated inspections carried out. The last category, outcome quality, examines the impact of a health department's work on the communities' health, examples are; declining rates of communicable disease or increasing rates of seat belt use (Derose, 2002).

Derose et al (2003), in a later work, identifies a number of limitations of health unit performance measures. The primary limitation is that some performance measures are ultimately beyond the control of the health department. Health units may be able to influence healthy behaviours but they not have ultimate control over the public health outcomes (Derose, 2003). This makes it difficult to identify clear associations of cause and effect between a public health program and societal benefit. A second limitation identified in the article is the potential ambiguities when it comes to the interpretation of a performance measure. The article suggests it is important that all measures should be

interpreted in the same fashion for all health departments being measured in order to ensure the data collected is accurate (Derose, 2003). If performance measures are not consistently measured then it can be considered a classic example of comparing apples and oranges.

Bailek et al (2009), identify three main areas of consideration when examining the quality of health unit performance. First are structural measures, which focus on a health unit's infrastructure or capacity. An example of a structural measure would be the ability to attract and retain qualified staff. Secondly there are process measures, which provide information on how well a health unit performs a process designed to impact the community's health. Finally, there are outcome measures which determine if a health department has achieved its performance target (Bailek, 2009).

The second area of research on this topic relates to the common characteristics of health departments that have been determined to have better performance. There are a number of characteristics identified in the following studies; however, there are two reoccurring themes identified: resources and population. Many of the articles reviewed determined that health jurisdictions with more resources (both financial and human), perform better than those with fewer resources. In addition, higher-population health jurisdictions were also found to have better performance than lower populated centres.

A study conducted by Richards et al (1995), surveyed 370 local health units in six states throughout the United States. Researchers examined 26 indicators in three main areas: assessment, policy development, and assurance. The authors determined jurisdiction population size relates positively to performance. The study also determined the organizational make-up of the health department was an important factor in

performance. The article reports that those health units with a centralized administration structure perform better (Richards, 1995).

Rohrer et al (1997), surveyed 99 counties in Iowa. The study identified that larger health jurisdictions (in terms of population size) performed better than small departments (Rohrer, 1997). The results infer larger population areas had more resources available to deliver public health programs (Rohrer, 1997).

Kennedy (2003), conducted a study of the performance of 47 local health departments in Texas and concluded that higher performing jurisdictions were positively correlated with larger community size and larger public health agency capacity. The characteristics identified under capacity were full time leadership, extra financial resources, more staff and policies related to staff recognition. These were all found to relate directly to the availability of resources in order to provide public health programs (Kennedy, 2003).

Another study, conducted by Scutchfield et al (2004), examined a number of variables which might impact public health department performance. They surveyed 152 health departments and examined twenty eight characteristic variables. The study concluded heath department performance was positively correlated with senior management education and orientation, resources and relationships with other jurisdictions and levels of government (Scutchfield, 2004). The researchers also identified the importance of consistent and relevant performance measures in order to effectively compare different health jurisdictions (Scutchfield, 2004).

Mays et al (2004), specifically examined the association between public health funding and the performance of health departments. The study was conducted across seven states and reviewed federal, state and local funding. The study used 10 measures of essential public health including the ability to investigate and diagnose health hazards in the community and enforce public health and safety laws and regulations. The results indicated health departments are significantly sensitive to funding levels. The effect seems to be more pronounced with the amount of funding at the local level compared to the state or federal levels (Mays, 2004).

A study conducted by Honore et al in 2004, examined the relationship between public health performance and funding patterns in 50 local health departments. The researchers attempt to determine if variation in revenues and expenditures can be correlated to performance. The dependant variable, a health department's ability to perform ten core functions includes: monitor population health status, investigate health hazards and enforcing public health legislation. The independent variables examined were financial and demographic. The financial areas of inquiry included; local revenues, revenues from state and federal sources, program expenditures and tax revenues per capita. The study identified a significant relationship between health department jurisdiction taxes per capita and performance. Locations with higher performance typically had higher taxes (Honore, 2004)

Another study conducted by Mays et al (2006), examined the characteristics of 315 American local health departments most strongly associated with performance. The study examined core public health services (e.g. investigating health hazards, enforcing legislation, and monitoring health status) to establish a score for performance. The researchers then examined characteristics in three main categories; institutional,

resources and community features. The article found that the size of the jurisdictions along with the size of the population were most positively associated with high performance (Mays, 2006).

Erwin (2008) conducted a literature review of 23 peer-reviewed articles and studies related to local public health department performance. His review indicated that there were some common characteristics identified among higher performing health departments. They include health departments with higher resources, both financial and human and larger community populations were more likely to have higher performance scores (Erwin, 2008).

A study conducted in North Carolina by Hajat et al (2009), identified 13 societal outcomes to measure health department performance. They included maternal outcomes, communicable disease measures, immunization data, smoking rates, cancer screening and food safety inspections. The study examined these measures over a five year period and measured any change over that time frame. The researchers concluded that local health unit features such as workforce experience, number of full time staff and population characteristics were all significant predictors of health department performance (Hajat, 2009).

A study published by Bhandari et al (2010), re-examined the studies conducted by Mays et al and Scutchfield et al using the same performance data from ten essential service areas. Researchers surveyed 529 local public health departments across 30 states. The study confirmed the main findings observed in the original studies, that population size may be the strongest predictor of health department performance. The study also determined jurisdiction type also appears to be related to performance. Smaller type

health service organizations did not perform as well as larger organizations (Bhandari, 2010).

A study conducted in Nebraska by Chen et al (2012), survey 16 local health departments regarding their performance related to three core areas; assessment, assurance and policy development. The survey results indicated population and geography are important factors in a health department's performance. However, more specifically, the study found jurisdictions with more heterogeneity (e.g. age, race, income, and population density) had lower performance. The researchers theorize the greater differences in population characteristics, within the health unit jurisdiction, make it more difficult and require more resources to meet the populations' needs in terms of positive public health outcomes (Chen, 2012).

Further study was conducted by Hyde et al (2012), examined health departments in Massachusetts and looked at their ability to perform 10 essential public health services which included food safety practices and communicable disease control. The results indicated a health department's capacity to carry out the 10 essential public health services was significantly associated with jurisdiction population, poverty rate, annual budget and the public health awareness of the politicians and citizens which make up the governing board of health (Hyde, 2012).

Another area of literature related to this study is in the area of organizational performance and job specialization. A study conducted by Capkun et al (2010), examined the role of job specialization and operational performance in the primary health care sector. The study examined 142 Austrian hospitals over a four year period. It examined the length of hospital stay of over 300,000 patients. It found that hospitals

with increased specialization in their services were found to be more efficient with patients having, on average, short hospital stays (Capkun, 2010). While not associated directly with the public health field, this issue is worth exploring in this study as many health units in Ontario design their food safety program delivery as either specialized; meaning staff may only work in the food safety program or generalized when staff have a number of different public health program responsibilities.

The literature identified the types of measures that should be included in an assessment of a health department's performance. The research typically used core functions of public health organizations, such as inspections, to establish a measure for comparison. In addition, performance was also measured using public health outcomes in a community, such as obesity or smoking rates.

The literature also identified a number of health jurisdiction characteristics that are often associated with higher performance. Two reoccurring characteristics identified were: higher resources (both human and financial) and higher population centres.

Hypothesis

The literature review makes clear that there is a lack of focused research on the characteristics of a well performing food safety program administered by local health departments. There is information on the specific components that should make up a modern food safety program; however, little is written on performance (Wagstaff, 1986). However, there is significant information about the characteristics of well performing health departments, which include food safety programs.

This study examines the characteristics of the 36 health units in Ontario to determine which are positively associated with high performance in their food safety programs. The dependent variable is the performance of food safety programs, which is measured through compliance rates of required inspections of food premises, which is the primary function of food safety programs in Ontario. The independent variables will be the characteristics indentified in the literature search that can influence health department performance.

The research hypothesis for this study is: If an Ontario health department's food safety program is high performing then it should have some common characteristics as other health departments with high performing programs. The null hypothesis is: There is no observable difference in food safety program performance among health units attributable to health unit characteristics.

Methodology

Ontario is divided into 36 public health jurisdictions that provide food safety programs. Because the number of units is small, all departments were attempted to be surveyed. In order to try to ensure a consistent response, the survey was sent to the department director and/or manager responsible for the food safety program. The survey, along with a requesting letter (Appendix #1), was emailed directly to the appropriate staff with a suggested response date.

The first step in conducting this research is establishing a measure for performance of a health unit's food safety program. All of the studies reviewed in the literature section examined health department performance not any specific program. Therefore, using the board measures identified in many of the studies (e.g. policy development, community

assessment) is not applicable. This data will be specific to food premises inspection frequency, based on already established performance measures set by the MOHLTC (OPHS, 2008). The benefit of this data set is the information is already collected and available from health departments, as it is reported annually to the MOHLTC. The exact measures will be discussed in the measurement section of this paper. For the purpose of this study, 2012 inspection data was requested.

Information was also collected related to the characteristics of each health unit jurisdiction. Part of the data was obtained through the survey. Additional information was obtained from the MOHLTC and Statistics Canada. The following information regarding the characteristics of each health unit was collected:

Resources

In studies mentioned previously, it was identified that health units with more resources, both financial and human, were generally characterized by higher performance. For the purposes of this study the survey questions were specific to the food safety program rather than the health department as a whole. Information collected includes; annual costs of administering the food safety program including items such as materials and resources along with staffing costs such as salaries and benefits. In addition, the number of full time equivalents (FTE) staff dedicated to the food safety program was requested. As mentioned previously, more staffing resources are often associated with better performing health departments (Scutchfield, 2004). Respondents were also asked to identify the FTE of direct supervision, either manager or supervisor provided to the staff of the food safety program. It is presumed that health units that are adequately resourced will have an adequate number of managers and supervisors to manage staff.

Health Department Demographic

The literature review revealed that health unit performance is often associated with larger health department population size. Studies determined that this characteristic might be associated with resources as more population typically results in more available resources however, it still is important to measure these two variables separately in case their effect on performance is independent of one another. There are many different methods to categorise population centres, for example the MOHLTC document, *Initial Report on Public Health* (Ministry of Health/Public Health Branch, 2009) categorizes health regions into the following groups; rural northern, mainly rural, sparsely populated urban/rural, urban rural mix, urban centres, and metro centre. For the purposes of this study, using the MOHLTC criteria, health units will be divided into two categories: rural and urban/suburban. Those health departments categorized in the rural northern, mainly rural and sparsely populated urban/rural groups were classified as rural. The remaining health units in the urban rural mix, urban centres and metro centre categories will be classified as urban/suburban. When combined with population data, rural health units had an average population of 144,758 while urban health units had an average population of 569,749. If Toronto, the largest urban centre, is excluded from the urban category, the population average for urban health units is 506,104 (Statistics Canada, 2012).

Job Specialization or Generalization

The Capkin et al (2010), review determined that job specialization may impact employee performance which, therefore, impacts organization performance in the primary health care sector. The survey sent to health units inquired about the design food safety programs, specifically whether it was a specialized or generalized structure. However, there is no specific definition of specialized or generalized program delivery. For the

purposes of this study a specific definition of specialized was provided for survey respondents to consider. Staff who spend 85% or more of their time doing food safety related activities were considered specialized. In addition, a third option was provided for respondents to consider, a hybrid program delivery model which was defined as staff who provide food safety duties along with only one or two other public health programs on a regular basis.

Health Unit Geography

According to the literature review a health unit's geography may play a role in its performance. Data was collected from the MOHLTC which identified each health jurisdiction's size in square kilometers. Each of Ontario's 36 health units is a unique jurisdiction of varying sizes, on one end of the spectrum is the City of Toronto at 630 km^2 all the way to Porcupine Health Unit at 266,291 km^2 (Ministry of Health/Public Health Branch, 2009). Analysis will attempt to determine if geographic size influences inspection score. The size of a health unit's jurisdiction may be a benefit or a hindrance when it comes to performance. One possibility is that a larger health region is usually more populous which often equates to more resources. Conversely, a large jurisdiction may mean population centres are spread far from one another requiring increased travel time and expense or it may even necessitate the need for sub-offices and related costs. The study will attempt to determine if geography is an important factor in food safety program performance.

Administrative Structure

In Ontario BOH are structured in three main ways: 22 are stand-alone, which means they operate independently of the local municipal structure; four are autonomous but integrated in the municipal structure; and the remaining 10 are regional or city where the municipal council acts as the BOH (Capacity Review Committee, 2006). This type of structure is unique in Canada. There is some debate as to the most effective administrative model in Ontario (Alpha, 2001). Part of the debate relates to the ability of health departments to secure regular steady funding in order to carry out the required programs and services. Stand-alone health units are responsible to the board of health and their annual budget must be approved by that board. The members of a board of health, in a stand-alone jurisdiction, are made up of local politicians and members of the public. The impact of health unit structure on program performance may be related to resources. Each municipality within a health unit jurisdiction provides annual funds to the health unit at a percentage based on the municipality's population size. In many cases in Ontario, there are numerous municipalities that contribute funds to one board of health. This can cause some difficulties on agreement on the annual budget (Scott, 2004). Regional or city health departments are a part of the overall municipal structure and their budget and budget process are often combined with the other departments within the jurisdiction, which can make the budget process more streamlined. Another advantage regional and city health departments have over their stand-alone counterparts is available infrastructure. Stand-alone health units often need in-house staffing and contract services for areas such as finance, human resources and information technology. Regional and city health departments have those resources available due to being imbedded within the larger municipal structure (Scott, 2004). The study attempts to determine if this variable impacts program performance.

Measurement and Analysis

As mentioned in the previous section, the main method of data collection was through the use of a questionnaire survey. The survey respondents were promised confidentiality in their participation with this study. Therefore, all data included in this report will be stripped of identifying information. The intent of the survey was to collect information regarding a health department's food safety program (dependant variable) and the health department factors that may impact the programs performance (independent variables). The survey included a brief introduction as to the purpose and importance of the study and some health department and personal identifier questions with the hopes of engaging the respondent to finish the questionnaire (O'Sullivan, 2008). The next section was specific questions regarding the inspection frequencies for 2012. The third section asked questions related the health department characteristics which make up the independent variables. Additional information was collected from the MOHLTC document; *Initial Report on Public Health 2012 Update* which identifies a number of different characteristics of each jurisdiction (MOHLTC, 2012). Population data was collected from Statistics Canada, 2011 Census Profile.

The first step in order to conduct this analysis is to employ the use of dichotomous variables. The health departments being examined would either have the characteristic or not, therefore the response would be assigned a value of "1" when having the characteristic or "0" if the characteristic is being reported as not present. This step is critical by ensuring variables are equal when being compared. It allows for a direct comparison of variables when interpreting the results of analysis. A number of the independent variables needed to be categorized in order for this step to occur. The variable urban versus rural was established by grouping the MOHLTC original 5 categories into the two. For this study, health units included in the categories of Rural

Northern Region, Mainly Rural and Sparsely Populated Urban-Rural Mix were grouped under rural health units and Urban-Rural Mix and Urban Centres were categorized as urban. The survey also asked health units identify their food safety program structure, either specialized, generalized or hybrid. The majority of health units identified as having either a specialized or generalized structure with only six health units identifying as having a hybrid model of program delivery. It was decided to group these six health units with the specialized category due to the similarities between the two types. In Ontario, health unit structures are categorized as autonomous, stand-alone, regional or city. For the purposes of this study health units were divided into two groups stand-alone/autonomous and regional/city.

Descriptive Analysis

Surveys were sent to all 36 health units in three stages. First, surveys were sent to health units in South West and North West Ontario. Two weeks later surveys were then sent to health units in South Eastern and North Eastern Ontario and finally two weeks later, Central West and Central East were surveyed. Responses were received from 34 of 36 health units resulting in a 94% response rate. A number of follow up phone calls were required to clarify respondent's answers.

Using the MOHLTC criteria of the 34 health units surveyed 16 (47.1%) were classified a having primarily a rural environment. The remaining 18 (52.9%) were classified as having mostly urban environments. Health unit administrative structure was also obtained from the MOHLTC data.

As Table #1 below indicates, of the 34 health departments included in the study, 27 or 79.4% were classified as autonomous or single tier with the remaining 7 or 20.6% identified as regional/city.

Table #1 Health Department Structure

		Frequency	Percent
Valid	Autonomous or Single Tier	27	79.4
	Regional/City	7	20.6
	Total	34	100.0

The survey asked respondents to identify their food safety program structure, either generalized, specialized or hybrid program delivery, see Table #2 below. Of the responses, the majority of health units (24 or 70.6%) indicated they deliver food safety inspection programs in a generalized fashion. Six health units identified their program delivery as hybrid, and after a discussion with the program manager it was decided to include these departments in the specialized category.

Table #2 Food Safety Inspection Program Structure

		Frequency	Percent
Valid	Generalized	24	70.6
	Specialized	10	29.4
	Total	34	100.0

Health units were also asked to identify the number of program staff for their food safety programs. In order to allow some comparison the FTE data was divided by the number of food premises located within the jurisdiction of the health units. The established value used for this study was the number of food premises per public health inspector. In addition, health departments were asked to identify their management/supervisor staff compliment.

This value was established by dividing the management FTE by the number of staff within the food safety program. The Table #3 below indicate the general results.

Table #3 Program Staffing

	N	Minimum	Maximum	Mean	Std. Deviation
Premises_per_PHI	34	72.64	387.290	189.569	62.24
Man_per_PHI	34	.02	.33	.11	.066

The survey also included questions related to health unit resources, specifically budget of the health department food safety program. Unfortunately, only 25 health units were able to provide this information. In a number of follow up conversations with survey respondents, it was indicated that the financial figure respondents provided was only a "ballpark" and it was only an estimate amount. In many cases the reason provided for the inability or difficulty in providing this information was due to health units having a general overall budget, not one divided by program area. This was often the case in many of the smaller jurisdictions. Therefore, it was decided this variable would be excluded from the analysis due to the lack of data for the full 34 health units surveyed. Findings regarding resources will be considered using the information and analysis of the staffing related questions in the survey.

Dependant Variable – Health Unit Food Safety Score

The first component of measurement is the establishment of a value for the performance of a food safety program. Health units are required to report on a variety of food safety program related measurements on an annual basis. This includes information related to the inspection frequency of food premises inspections. Inspection frequency is related to

an assigned risk of the food premise establishment. In Ontario, food premises are assigned a risk of high, moderate or low by public health inspectors while conducting their inspections. High risk premises, such as hospitals, daycare and full service restaurants serve risky foods commonly associated with outbreaks (beef, chicken, pork, rice, etc) and/or serve foods to high risk populations (the ill, elderly, children). In addition, a food establishment may be assigned a high risk rating if they have a history of noncompliance or have been identified as the source of a foodborne outbreak. These premises are required to be inspected a minimum of once every 4 months. Moderate risk premises such as fast food establishments, bakeries and take outs that serve the general public are required to be inspected a minimum of once every six months. Low risk premises, such as convenience stores are required to be inspected a minimum of once per year (OPHS, 2008). The survey requested information regarding the total number of premises in each category which were open for the entire calendar year of 2012. Seasonal premises and those which opened or closed during the year were not included. This is consistent with the annual reporting provided to the MOHLTC. In addition, the survey asked respondents for the inspection numbers related to the completed inspections for each risk category within each of the appropriate time frames. This allowed for a calculation of the percentage complete, for each category (H-high, M-moderate, L-low), for the inspections completed in 2012.

These three variables were used to establish a measure of the performance of a health department's food safety program. However, not all of the categories have the same importance. High risk food premises, as the name suggests, should be weighted more heavily than the other two categories when determining a health department's final food safety program score. For the purposes of this study high risk premises inspection completions will be given a weight of three, moderate risk two, and low risk a weight of

one. The number of completed inspections, for each category, was divided by the number of required inspections, according to the MOHLTC protocol, and then multiplied by the assigned weighted value.

The values of all three categories were then added to establish an inspection score for each health unit. The following formula was used:

(# of completed HR inspections/# of required HR Inspections x 3) + (# of completed MR inspections/# of required MR Inspections x 2) + (# of completed LR inspections/# of required LR Inspections x 1) = Inspection score

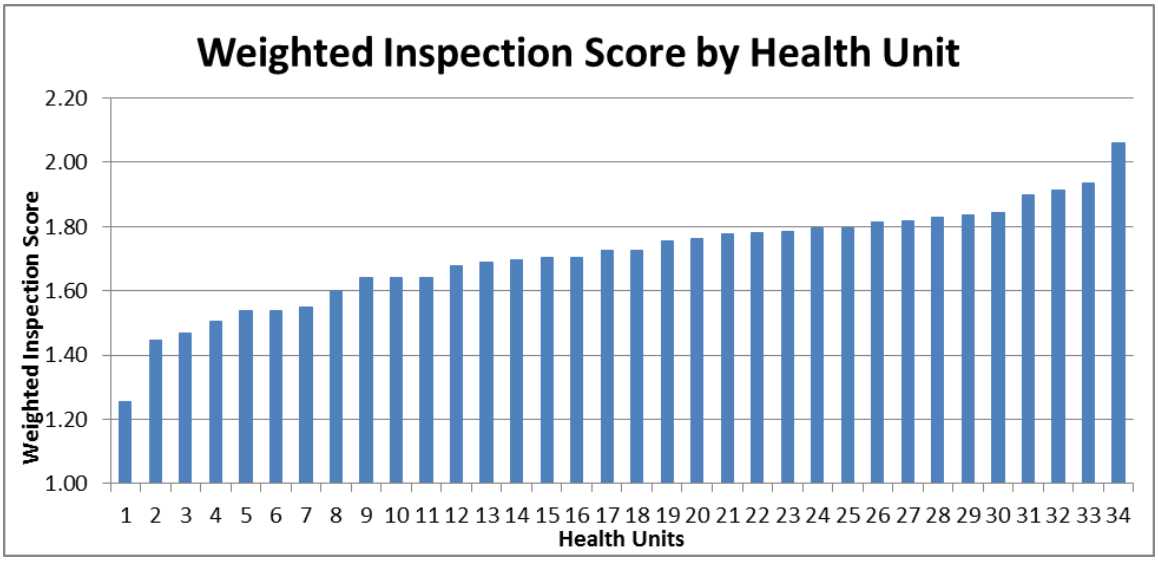
The next step to establish a health unit score was to account for the variation in the numbers of high, moderate and low risk premises between health units. The risk categorization is based on a framework established by the MOHLTC (MHPSG, 1997). However, the process is not highly prescriptive and allows for local health unit interpretation when assigning risk to food establishments. This method of risk categorization can result in the same type of food premises being assigned a different risk category between various health units. There is also the potential risk of skewing the risk assessment in the health unit's favour as a lower assigned risk rating results in fewer inspections required. This is potentially more likely to occur with the MOHLTC's introduction of the Public Health Accountability Agreements. The agreement indicates the inspection completion targets each health unit must reach for all high risk food premises. In theory, there is incentive for a health unit to underestimate the number of high risk premises in order to ensure they are all inspected as required by the agreement. Essentially, a lower number of high risk establishments require less time and resources to meet the MOHLTC targets. In an attempt to minimize this issue and

maximize the accuracy of the analysis, a further calculation was completed to establish the inspection score. This measure expanded on the score from the previous step. The final score was established by dividing the number of food premises in each risk category by the total number of food premises in the health unit and multiplying this number by the completion percentage for the risk category and multiplying that number by the weighting value (H=3, M=2, L=1). The values for the high, moderate and low categories were then added to generate an inspection score. The following formula was used:

((# of HR premises/Total # of premises) x HR Inspection Completion % x 3) +((# of MR premises/Total # of premises) x MR Inspection Completion % x 2) + ((# of LR premises/Total # of premises) x LR Inspection Completion % x 1) = Inspection Score

Figure #1 below is the results of the weighted inspection score by health unit. The values are represented from low score to high score.

Figure #1. Weighted Inspection Score by Health Unit



The following table represents the mean and distribution of the dependant variable, including the percentage of completed inspections for each category and independent variables.

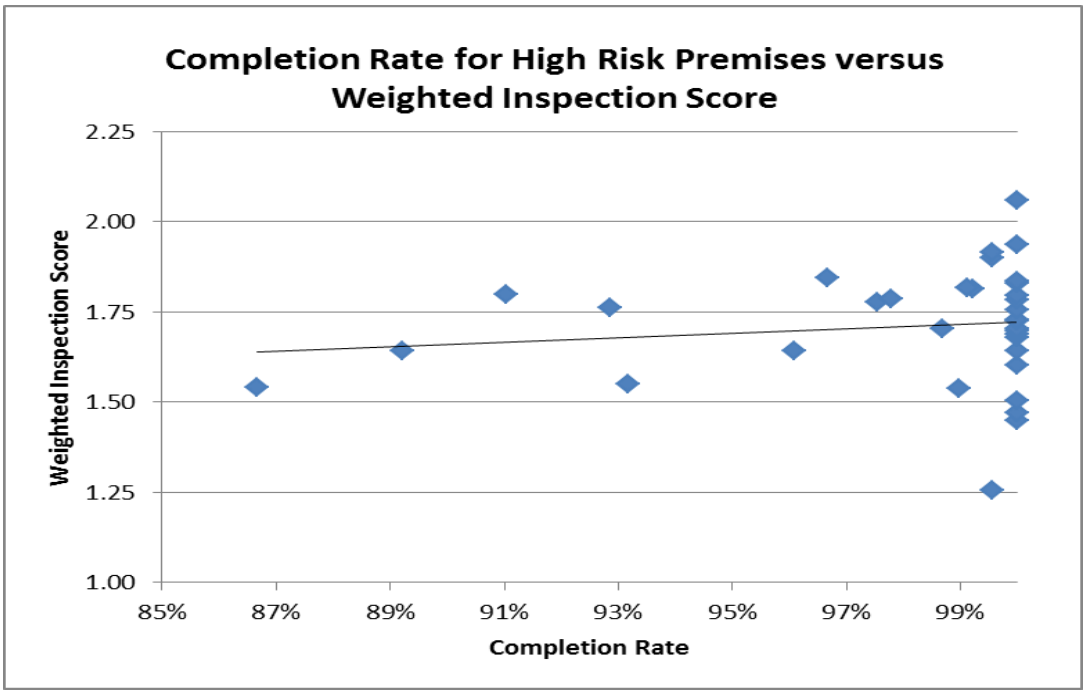
Table #4 Descriptive Statistics

	N	Minimum	Maximum	Mean	Std. Deviation
pct_high	34	86.7%	100.0%	98.110%	3.4484%
pct_mod	34	64.4%	100.0%	92.456%	10.4554%
pct_low	34	54.8%	100.0%	87.846%	14.7326%
INSP_Score	34	4.7384	6.0000	5.670889	.3768422
INSP_Score_Weighted	34	1.2558	2.0599	1.710558	.1600316

The established weighted inspection score was then compared to the completion rates for high, moderate and low risk food premises. These values were then plotted on scatter plots. This was conducted in order to ensure the established score is correlated to the completion rates for the three categories of food premises. For all three categories (high, moderate and low) the trend indicates that as health departments inspection completion rate rises so too does its weighted inspection score. This provides some assurance that the established weighted score is a good representation of the data.

Below in Figure #2 is the scatter plot graph for high risk food premises completion rate and inspection score. The graphs for moderate and low risk premises can be found in Appendix #2.

Figure #2. Completion Rate for High Risk Premises versus Weighted Inspection Score



Bivariate Analysis

The next step in the analysis was to conduct bivariate analysis to determine if there are any relationships between any of the independent variables surveyed to the weighted inspection score for health units (dependant variable).

Urban versus Rural

An analysis of the relationship between food safety inspection score between rural and urban health units was conducted. The determination of rural versus urban was established by using the MOHLTC's health unit profiles (MOHLTC, 2011). The data indicated a close to even split between the two criteria with 16 health departments being identified as rural and the remaining 18 as urban. As Table #5 indicates below there is a significant relationship between inspection score and health unit characteristic. Urban health units have higher inspection scores than their rural counterparts.

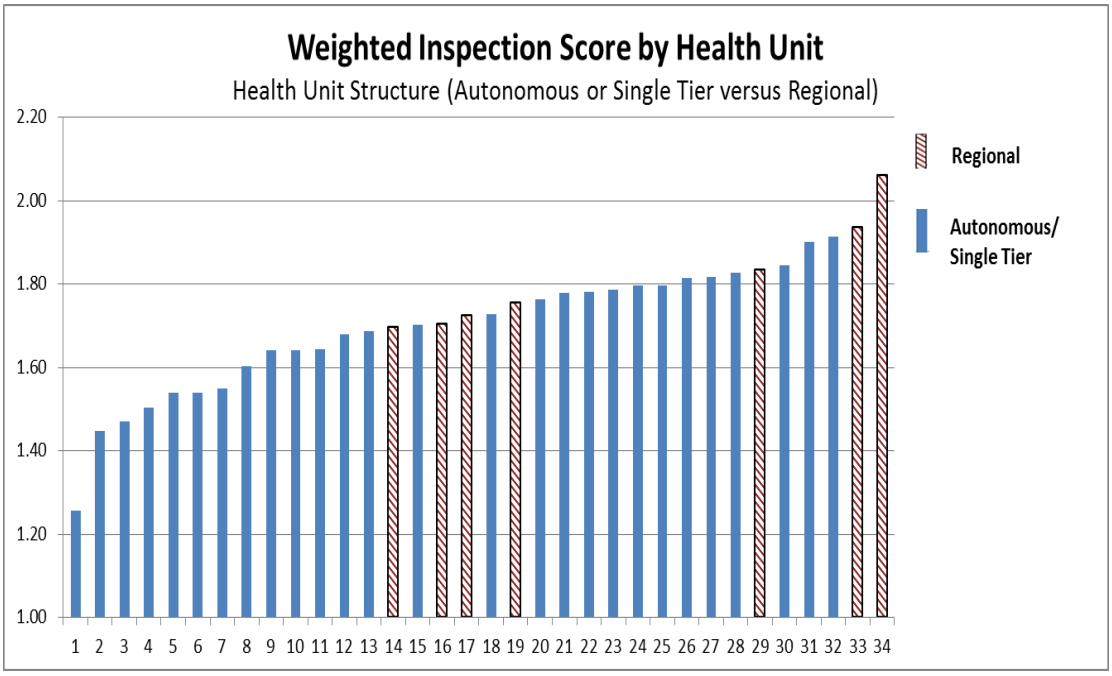
Table #5 Rural versus Urban Independent Samples Test

		t-test for Equality of Means		
		t	df	Sig. (2-tailed)
INSP_Score_Weighted	Equal variances assumed	-3.608	32	.001
	Equal variances not assumed	-3.556	28.386	.001

Autonomous or Single Tier versus Regional

The MOHLTC data indicated 27 of the 34 health units as having an autonomous or single tier administrative structure. The independent samples T-test indicates a significant p value of 0.049 indicating a significant relationship between health unit structure and its food safety inspection score. According to these results regionally structured health units are more likely to have higher inspection scores compared to those health units which are autonomous or single tier. Figure #3 on the next page, represents the inspection score by health unit with the health unit structure indicated by colour.

Figure #3 Weighted Inspection Score by Health Unit Structure



Generalized versus Specialized Program Delivery

Of the 34 health units surveyed 24 identified as providing a generalized food safety inspection program, meaning public health inspectors conducted duties for many other program areas not just food safety. The independent samples T-test results are show below in Table #6.

Table #6 Generalized versus specialised -Independent Samples Test

		t-test for Equality of Means		
		t	df	Sig. (2-tailed)
INSP_Score_Weighted	Equal variances assumed	-1.887	32	.068
	Equal variances not assumed	-2.052	20.560	.053

While shown not to be significant the values are trending towards significance.

Staff Resources

The next analysis that was conducted examined the program staffing characteristics. The number of public health inspectors per food premises and the number of management/supervisors per food safety public health inspector. For this analysis, a simple linear regression for continuous variables was performed. Table #6 below represent the relationship between inspection score and number of food establishments per public health inspector.

Table # 6 Premises per PHI Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	1.796	.089		20.152	.000
	Premises_per_PHI	.000	.000	-.176	-1.013	.319

a. Dependent Variable: INSP_Score_Weighted

Premises per PHI - ANOVA[b]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	.026	1	.026	1.026	.319[a]
	Residual	.819	32	.026		
	Total	.845	33			

a. Predictors: (Constant), Premises_per_PHI

b. Dependent Variable: INSP_Score_Weighted

This relationship was found to be not significant with a p-value of 0.319. This method of analysis was then used to examine the relationship between the number of management per public health inspector and inspection score.

As Table #7 below indicates this relationship was also found to not be significant.

Table # 7 Management per PHI - Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	1.751	.056		31.470	.000
	Man_per_PHI	-.356	.424	-.147	-.840	.407

Management per PHI - ANOVA[b]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	.018	1	.018	.705	.407[a]
	Residual	.827	32	.026		
	Total	.845	33			

a. Predictors: (Constant), Man_per_PHI

b. Dependent Variable: INSP_Score_Weighted

Geography

Further analysis was carried out examining the size of each health jurisdiction related to its food safety inspection score. A simple linear regression was conducted using the inspection score as the dependant variable and the size of a health region in kilometers squared as the independent variable. Table #8 below indicates that the relationship between health unit size and food safety inspection score is not significant.

Table # 8 Health Unit Geography - Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	1.714	.030		57.662	.000
	KM2	-1.960E-7	.000	-.065	-.367	.716

a. Dependent Variable: INSP_Score_Weighted

Multivariate Analysis

Based on the bivariate analysis results above, focus of the study moved towards those variables which were shown to be significant or trending towards significance. Food safety program administration, health unit structure and urban or rural environment were examined using multivariate linear regression. As Table # 9 below demonstrates, 31.8 percent of the variation in a health unit's inspection score can be attributed to the three independent variables above.

Table # 9 Multivariate Analysis

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.564[a]	.318	.250	.1385701

a. Predictors: (Constant), Rural_Urban, HU_Struct_RECODED, ADM_G_S

ANOVA[b]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	.269	3	.090	4.671	.009[a]
	Residual	.576	30	.019		
	Total	.845	33			

a. Predictors: (Constant), Rural_Urban, HU_Struct_RECODED, ADM_G_S
b. Dependent Variable: INSP_Score_Weighted

In order to rank the three dependant variables in order of their importance a Beta weights test was used. The larger the Beta weight the stronger the relationship to the dependant variable (O'Sullivan, 2008). Table #10 on the next page indicates the Beta weights for the three variables. The analysis indicates the variable, rural versus urban, plays a significant role in explaining the health unit food safety inspection score compared to the other two variables.

Table # 10 Beta Weights

Model		Standardized Coefficients	t	Sig.	95.0% Confidence Interval for B	
		Beta			Lower Bound	Upper Bound
1	(Constant)		46.248	.000	1.545	1.688
	ADM_G_S	.004	.021	.983	-.129	.132
	HU_Struct_RECODED	.180	1.043	.305	-.067	.207
	Rural_Urban	.476	2.742	.010	.038	.262

In addition, when the significance is examined in this model, rural versus urban is the only significant factor in explaining the variation in inspection score with a p-value of .01.

Further analysis conducted on the rural versus urban variable to determine the relationship of the variable on inspection score. Table #11 below indicates the Beta weight from the stepwise regression analysis.

Table #11 Beta Weights Rural versus Urban

Model		Unstandardized Coefficients	
		B	Std. Error
1	(Constant)	1.621	.034
	Rural_Urban	.170	.047

Using the formula y = ax + c where y is the inspections score, a is 0.17 B score, x is the value for rural (0) and urban (1) plus the constant 1.621. Using this formula we conclude, on average there is an increase of 0.17 in weighted inspection score for urban health units when compared to rural health units.

Risks

Analysis of the data indicates the three variables: (food safety administration [generalized versus specialized], health unit structure [autonomous versus regional/city] and rural versus urban) may be closely related. The risk of including these three potentially closely related variables in a multivariate analysis is the equation may not be able to differentiate between the related variables. This is termed multicollinearity. It can result in variables which in fact are related to the dependant variable being represented as not significant. In order to determine if the three variables are closely related it was decided to perform some cross-tabulations. Using Fishers Exact Test three two by two cross-tabulations were conducted (Appendix #3). The first calculation was performed using the variables; food safety program administration (specialised versus generalised) and rural versus urban health unit. The Fisher's Exact Test resulted in a p-value of .008 which means these two variables are significantly related. The second equation was performed using health unit structure (autonomous versus regional/city) and rural versus urban. This resulted in a p-value of .09. While it does not demonstrate significance it can be inferred that the two variables are trending towards significance and caution should be taken if considering using them both in the same multivariate model together. The final cross-tabulation was conducted with the final variable combination; food safety program administration (specialised versus generalised) and health unit structure (autonomous versus regional/city). This equation resulted in a p-value of .014 meaning the two variables are significantly related.

Discussion

Based on the analysis it was found that a health unit's inspection score is influenced by the following variables; specialized versus generalized program delivery, urban versus rural environment and autonomous versus regional or city departmental structure. It was

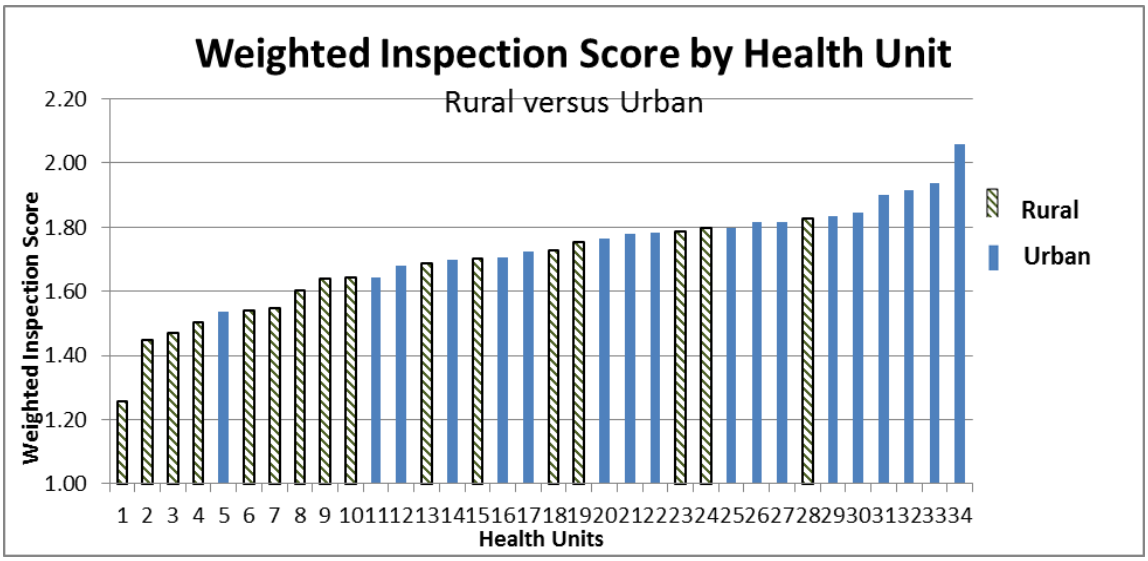
observed that 31.8% of the variation observed in the inspection scores can be attributed to these three variables. It is unfortunate that a measure of financial resources for food safety programs, for all health departments could not be established in order to determine if food safety program finances also impact program performance. However, the analysis of the staffing independent variables; public health inspectors per food establishment, which is related to program funding was conducted. The results showed no significant relationship between staffing and inspection performance exists. Also, when analysis was conducted examining management staff per public health inspector it too exhibited no relationship to inspection score. Therefore, since human resources are closely linked to program funding, it appears that resources may play a limited role in determining program performance in Ontario. However, without a thorough analysis this assumption is far from definitive. Geography was also not found to be significantly related to inspection score. The analysis indicates a health unit's jurisdiction size, does not appear to impact food safety inspection performance.

Of those three variables included in the multivariate linear regression, the one most strongly associated with inspection score was whether a health department was in an urban or rural environment. It was also the only variable with a significant p-value (0.01). However, considering the risk of multicolinearity, it is important to examine the variables in isolation. The bivariate analysis results for urban versus rural indicate a very significant relationship with a p-value of .001. In addition, when a stepwise multivariate linear regression model is used, it produces a R squared value of .289 for the urban/rural variable. This demonstrates the importance of the urban versus rural variable on inspection score as the R squared value for all three variables in the multivariate linear regression was .318. Therefore, where 31.8% of the variation in inspection scores can be attributed to the three variables, when two variables (health unit structure and food

safety program administration) are excluded from the analysis it results in 28.9% of the variation being attributed to the urban/rural variable. Further analysis indicated that the urban characteristic was the factor that resulted in an increased inspection score on average compared to health units with the rural characteristic.

When examining Figure #4 below weighted inspection score and rural versus urban, it is observed that rural health units tend to have lower inspection scores. Conversely, urban health units are more likely to have higher inspection scores than their rural counter parts.

Figure #4. Weighted Inspection Score by Health Unit



Based on the results of this analysis, food safety program performance is affected by the characteristic of whether a health unit is considered urban or rural. On average there is an increase of 0.17 in weighted inspection score for urban health departments. Therefore, the null hypothesis can be rejected as there are significant differences in health unit performance affected by the analysed characteristics.

Some additional high level examination of the data was conducted to examine if the lower rural inspection scores were uniformly represented across all three categories of food premise completion rates. When graphed, (Appendix #4) the data appears to show no significant difference between rural and urban health units inspections of high risk premises. However, there does appear to be a significant difference when examining the completion rates for moderate and low risk premises. Rural health unit's overall inspection scores appear to suffer due to lower inspections in these two categories. Further analysis and examination would be required in this area to determine the significance and the possible reasons for these differences.

Limitations of the Study

There are likely to be other factors that impact health unit food safety program performance that were not tested in this study. However, based on the literature search, it is reasonable to assume some of the significant factors have been examined. A significant limitation of this study was the inability to collect food safety program expenditure data for all health units. Resources and funding were identified in a number of the studies reviewed in the literature, to be related to health department performance. While other measures were used in the analysis for this paper related to resources (public health inspector and management staff numbers), the ability to make any determinations on performance related to resources are very limited. An additional limitation of this paper is the self-reporting aspect of the data used for the dependant and independent variables. This could introduce bias into data collected in this survey. Health units were not requested to provide any supporting reports or data to verify the reported values. Another possible limitation of this study was the scope of the survey questions related to food safety programs. Often there are issues that can arise throughout the year which can drain program resources, such as a major foodborne

illness outbreak, emerging diseases (H1N1) or public health emergencies. These types of events can last many days and weeks and require significant human resources to deal with the issue. The survey could have contained a comments section with a prompt to provide explanation for any inspection completion issues.

Areas for Further Study

The analysis in this study found rural health department food safety inspection scores, which is an indicator of performance, tend to be lower than their urban counter parts. Further study in this area could include examining the characteristics of rural health units to identify the possible causes of these lower inspection scores. Related to this is would be to examine the reason moderate and low risk premise completion rates for rural health units appear to be significantly lower than urban health units while high risk premise completion rates appear to be similar between the two. Appendix #4 includes three graphs for each risk category completion rate for all surveyed health departments. There are a number of characteristics of rural health units that could be investigated further, such as resources. It would be useful if an accurate breakdown of food safety program funding for all health departments could be established. This would allow for a thorough comparison between jurisdictions. It has been noted in previous studies that financial management information is not often tracked in a manner that allows for comparison. Standardized financial tracking and reporting may allow for more accurate analysis and accountability (Honore, 2004). Another funding related area for consideration could include analysis of preferred organizational size for rural jurisdictions in order to have the necessary resources to deliver public health programs effectively. One of the main recommendations from a U.S. study which examined health unit performance and funding was for smaller jurisdictions to consider consolidation of services and resources with the intent of maximizing outcomes (Honore, 2004).

Another area for further examination would be to determine if health units with better performing food safety programs also have better performance in other public health program areas, or are the findings of this study limited to only food safety. The MOHLTC may be particularly interested in the performance of those programs identified in the accountability agreements, especially if there are common characteristics between well performing health departments.

Conclusion

Analysis of the data collected in this study indicates that a health department's food safety inspection performance is significantly related to its environment, specifically if the jurisdiction is a rural or urban setting. Health departments in urban areas of Ontario were found to have higher inspection completion scores compared to rural health units. Health unit administrative structure and food safety program administration were also found to have some limited effect on inspection score. Factors found not to be significantly related to inspection score included number of staff per food premises, number of management to staff ratio and the geographic size of a health unit's jurisdiction. Unfortunately, this study was unable to adequately obtain data related to food safety program funding which in other studies has been food to significantly impact local health department performance.

Therefore, the null hypothesis, there is no difference in food safety program performance between health units based on the health unit characteristics, was found to be false.

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Appendix #1 – Sample Letter and Food Safety Survey

Health Department
Health Protection Services
1151 Bronte Road
Oakville ON L6M 3L1
Fax: 905-825-8797

July 22, 2013

Name
Health Department
Address

Dear Mr. Sir/Madam:

RE: Food Safety Program Survey

I am writing to request your participation in a research study being conducted as the major research requirement for the completion of a M.P.A. at the University of Western Ontario.

This study examines the characteristics of the 36 health units in Ontario so as to assess their relationship with performance in food safety programs. More specifically, I seek to explain the variation in the performance of food safety programs which I measure using the compliance rates of required inspections of food premises. The explanatory factors include such key characteristics of health units such as staffing, budgets, board of health structure, specialized versus generalized program delivery, etc.

To assist please complete a 7 question survey related to your 2012 food safety inspection rates and provides the requested information on the characteristics of your health department. The survey should take no more than 20 minutes to complete. The study has been reviewed and approved by the Departmental Research Ethics Board at UWO.

The findings of the study will be shared with those health departments who choose to participate. No specific identifying information will be shared or distributed. I am anticipating having all data collected by September 30th; I hope I can count on your support.

Thank you for considering this request. If you have any questions, please contact me at the numbers or email listed below.

Sincerely,

Matthew Ruf,
Director - Health Protection Services
Halton Region Health Department
(W) 905 825-6000 ext. 7508
(C) 289-259-7647
matt.ruf@halton.ca

Food Safety Program Survey

Name of Health Department: *Name*

Contact Information

Name: *Name*

Title: *Title*

Email: *Email*

Phone #: *Phone*

Food safety programs are a cornerstone of public health in Ontario. They are vital to the overall health of a community. This survey explores the characteristics of food safety programs in Ontario.

The first part of this survey asks questions about your inspection rates in the 2012 calendar year for all high, moderate and low risk food premises. The second part seeks information about key characteristics of your health unit and program administration for the year 2012.

Your participation in this survey is voluntary and is greatly appreciated. A summary of the findings will be shared with all respondents in the form of a final report. The final report will not reveal the identity of health units by name or any other identifying information.

Food Safety Program Survey

Name of Health Department: *Name*

Part I. 2012 Food Safety Inspections

In 2012:

#	Question	Response
High-Risk Food Premises		
1. a)	How many **high-risk** food premises that were in operation for the entire year in 2012 did you have in your health unit inventory?	
b)	How many food premises received 3 or more compliance inspections in 2012 (According to the MOHLTC guidelines of once every 4 months)?	
c)	How many received only 2 compliance inspections?	
d)	How many received only 1 compliance inspection?	
e)	How many were not inspected?	
Moderate Risk Food Premises		
2. a)	How many **moderate-risk** food premises that were in operation for the entire year (2012) did you have in your health unit inventory?	
b)	How many food premises received 2 or more compliance inspections in 2012 (According to the MOHLTC guidelines of once every 6 months)?	
c)	How many received only 1 compliance inspection?	
d)	How many were not inspected?	
Low-Risk Food Premises		
3. a)	How many **low-risk** food premises that were in operation for the entire year (2012) did you have in your health unit inventory?	
b)	How many food premises received 1 or more compliance inspections in 2012 (According to the MOHLTC guidelines of once every 12 months)?	
c)	How many were not inspected?	

Food Safety Program Survey

Part II: Health Unit Characteristics in 2012

Name of Health Department: *Name*

#	Question	Response
4.	In 2012 what was your Board of Health expenditure for its food safety program (to the nearest 1000)?	

5.	How many PHI FTEs were assigned to the food safety program?	

6.	How many manager/supervisor FTEs were assigned to the food safety program?	

7.	Please identify how your food safety program is currently administered? Please choose one of the following:	
	Specialized (PHI staff perform food safety duties 85% or more of their time)	
	Generalized (PHI staff perform the full range of public health duties including food safety)	
	Hybrid (PHI staff perform food safety duties along with one or two other programs on a regular basis)	
	Other - *please describe*: *Add Text*	

Thank you for taking the time to complete this survey. If you have any questions please contact Matthew Ruf 905-825-6000 ext 7508 - Matt.Ruf@halton.ca

Appendix # 2 Completion Rate Scatter Plot Graphs for Moderate and Low Risk Premises

Figure #1 Completion Rate for Moderate Risk Premises versus Weighted Inspection Score

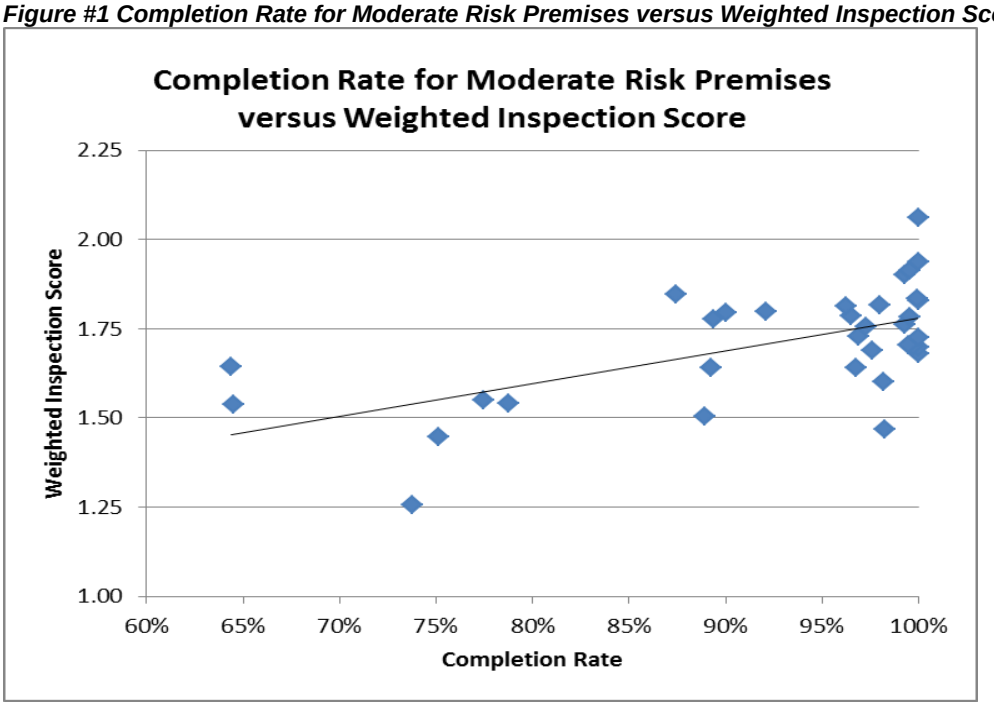
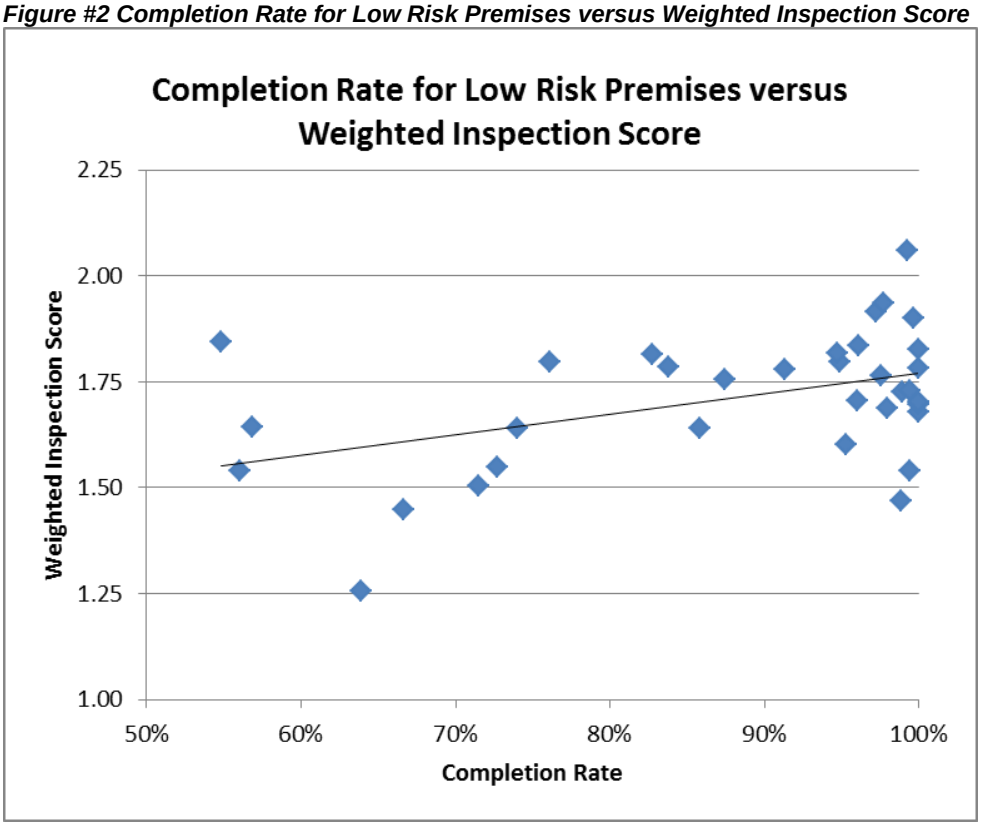


Figure #2 Completion Rate for Low Risk Premises versus Weighted Inspection Score



Appendix # 3 Cross-tabulations

Figure # 1 Cross-tabulation Program Administration and Rural versus Urban

Rural_Urban * ADM_G_S Cross-tabulation

			ADM_G_S		
			Generalized	Specialized	Total
Rural_Urban	Rural	Count	15	1	16
		% within ADM_G_S	62.5%	10.0%	47.1%
	Urban	Count	9	9	18
		% within ADM_G_S	37.5%	90.0%	52.9%
Total		Count	24	10	34
		% within ADM_G_S	100.0%	100.0%	100.0%

Chi-Square Tests

	Value	df	Asymp. Sig. (2-sided)	Exact Sig. (2-sided)	Exact Sig. (1-sided)
Pearson Chi-Square	7.809[a]	1	.005		
Continuity Correction[b]	5.844	1	.016		
Likelihood Ratio	8.760	1	.003		
Fisher's Exact Test				.008	.006
Linear-by-Linear Association	7.580	1	.006		
N of Valid Cases	34				

a. 1 cells (25.0%) have expected count less than 5. The minimum expected count is 4.71.

b. Computed only for a 2x2 table

Figure # 2 Cross-tabulation Health Unit Structure and Rural versus Urban

Rural_Urban * HU_Struct_RECODED Crosstabulation

			HU_Struct_RECODED		
			Autonomous or Single Tier	Regional	Total
Rural_Urban	Rural	Count	15	1	16
		% within HU_Struct_RECODED	55.6%	14.3%	47.1%
	Urban	Count	12	6	18
		% within HU_Struct_RECODED	44.4%	85.7%	52.9%
Total		Count	27	7	34
		% within HU_Struct_RECODED	100.0%	100.0%	100.0%

Chi-Square Tests

	Value	df	Asymp. Sig. (2-sided)	Exact Sig. (2-sided)	Exact Sig. (1-sided)
Pearson Chi-Square	3.800[a]	1	.051		
Continuity Correction[b]	2.324	1	.127		
Likelihood Ratio	4.179	1	.041		
Fisher's Exact Test				.090	.061
Linear-by-Linear Association	3.688	1	.055		
N of Valid Cases	34				

a. 2 cells (50.0%) have expected count less than 5. The minimum expected count is 3.29.

b. Computed only for a 2x2 table

Figure # 3 Cross-tabulation Health Unit Structure and Program Administration

ADM_G_S * HU_Struct_RECODED Crosstabulation

			HU_Struct_RECODED		
			Autonomous or Single Tier	Regional	Total
ADM_G_S	Generalized	Count	22	2	24
		% within HU_Struct_RECODED	81.5%	28.6%	70.6%
	Specialized	Count	5	5	10
		% within HU_Struct_RECODED	18.5%	71.4%	29.4%
Total		Count	27	7	34
		% within HU_Struct_RECODED	100.0%	100.0%	100.0%

Chi-Square Tests

	Value	df	Asymp. Sig. (2-sided)	Exact Sig. (2-sided)	Exact Sig. (1-sided)
Pearson Chi-Square	7.496[a]	1	.006		
Continuity Correction[b]	5.164	1	.023		
Likelihood Ratio	6.944	1	.008		
Fisher's Exact Test				.014	.014
Linear-by-Linear Association	7.275	1	.007		
N of Valid Cases	34				

a. 2 cells (50.0%) have expected count less than 5. The minimum expected count is 2.06.

b. Computed only for a 2x2 table

Appendix #4 – Completion Rate of High, Moderate and Low Risk Premises by Health Unit

Figure #1 Completion Rate of High Risk Premises by Health Unit

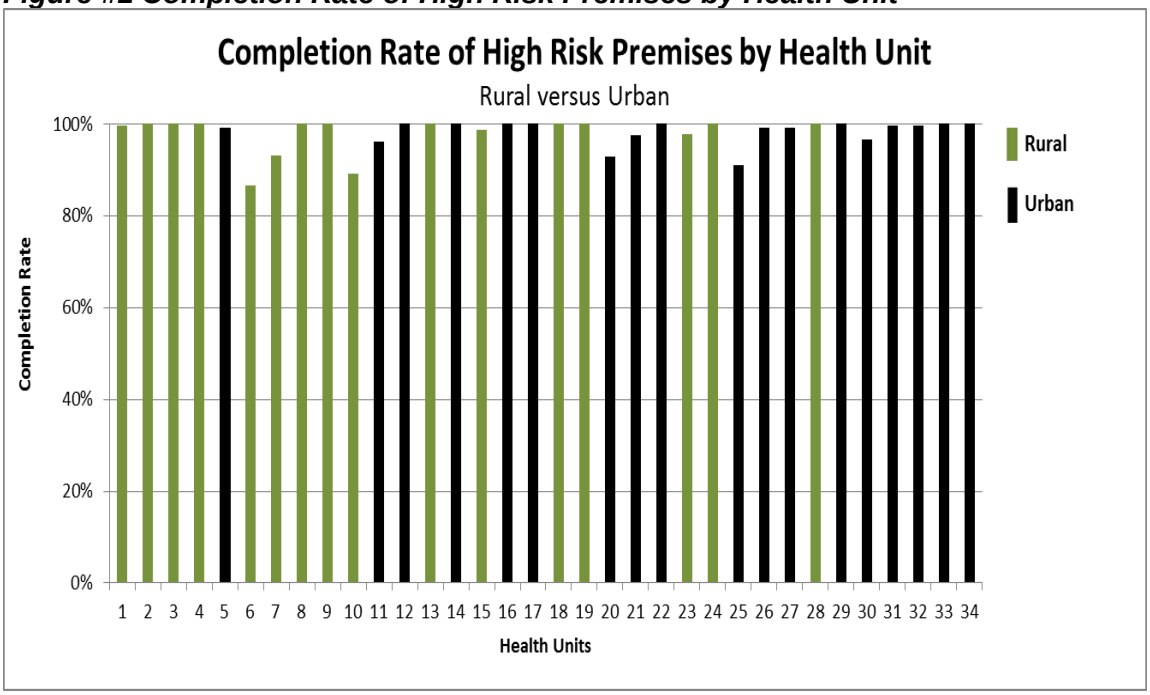


Figure #2 Completion Rate of Moderate Risk Premises by Health Unit

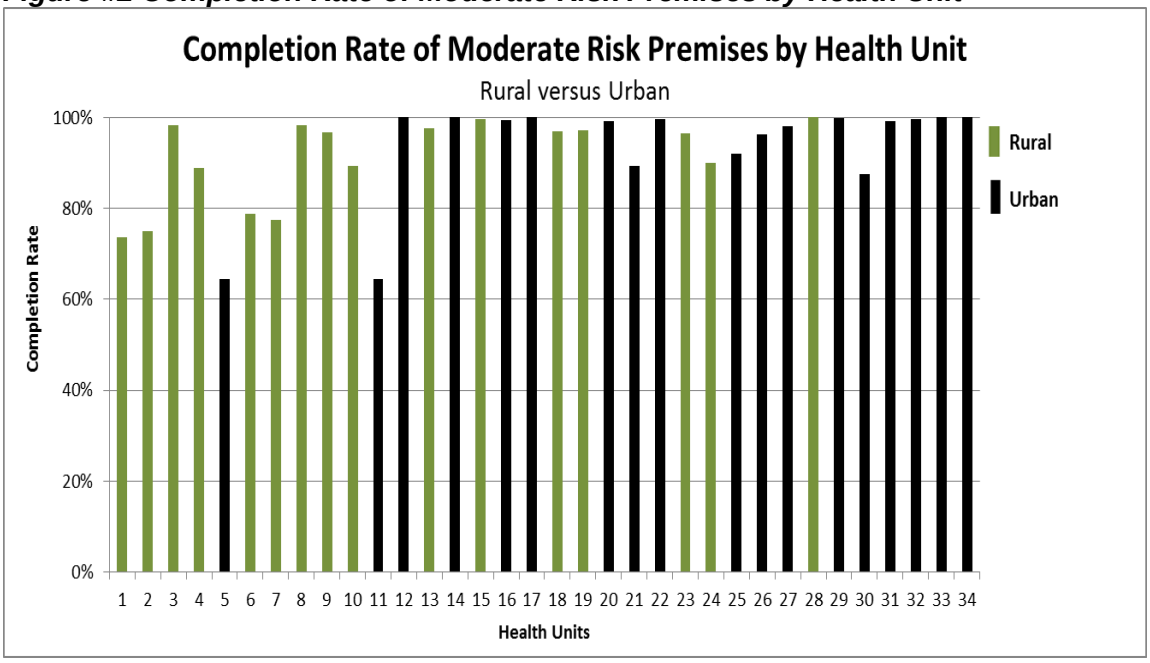


Figure #3 Completion Rate of Low Risk Premises by Health Unit